

REMARKS

The title of the invention has been amended in accordance with the Examiner's suggestion to read: METHOD OF MAKING NON-STICK COOKWARE.

Claims 1-16 are pending in the application. Claims 1-10 have been withdrawn from consideration by way of an earlier-filed election.

Claim 12 stands rejected under 35 U.S.C. §112, second paragraph, as being indefinite. Claim 12 has been amended by replacing "comprising" with --consisting of-- as suggested by the Examiner.

Claims 11-16 stand rejected under 35 U.S.C. §103(a) as being unpatentable over U.S. Patent No. 4,204,021 to Becker in view of U.S. Patent No. 6,360,423 to Groll.

The main claim in the application, namely, independent claim 11, has been amended herein to further specify, in step (c), that the metal-ceramic layer is applied by "high temperature spraying" and that the applied metal-ceramic layer has a controlled porosity of "between about 5-15% by volume". Step (c) as amended further provides that the applied metal-ceramic layer has "a plurality of upstanding sharp peaks". Step (d) has also been amended to provide that the liquid release agent is applied by vacuum impregnating the pores of the said metal-ceramic layer. Step (e) has been further amended to clarify that the thermal curing takes place for the impregnated liquid release agent. Smoothing step (f) has been amended to further require removal of the upstanding sharp peaks of metal-ceramic material to provide a non-stick surface defined by flat bare metal-ceramic portions and flat impregnated, cured release agent areas substantially co-planar therewith.

All of the claim amendments made herein find support in the application as filed. No new matter is presented. For example, support for the 5-15% by volume and 7% by volume porosities is found in paragraph 23 on page 4; the presently preferred metal-ceramic materials, including molybdenum oxide in paragraph 21 on page 4; the upstanding sharp peaks of metal-ceramic material and removal thereof by smoothing in paragraph 24 and 28 on pages 4-6.

As stated above, claims 11-18 stand rejected as being allegedly obvious over Becker in view of Groll '423. The Examiner opined that Becker teaches all of applicant's claim limitations except (b) and (f), and with respect to the smoothing step (f), the Examiner alleges that Groll teaches this step because Groll teaches that a smooth cookware surface is desirable to further enhance the non-stick properties thereof and that a cookware surface may be polished to achieve this, citing column 3, lines 36-60 of Groll. Applicant respectfully

disagrees with the Examiner and requests reconsideration in light of the amendments made to the presently-pending claims taken with the following remarks.

Main claim 11 now requires that the metal-ceramic layer is applied by high temperature spraying to provide a controlled porosity of between about 5-15% by volume and that a liquid release agent is vacuum impregnated into this porous metal-ceramic layer. Claim 11 also specifies that the applied metal-ceramic layer is characterized by having a plurality of upstanding sharp peaks which are later removed in the smoothing step.

A careful review of Becker reveals that the surface applied in Beck is not a metal-ceramic layer but, rather, a layer comprising a mixture of ceramic particles in combination with a fritted vitreous binder, i.e., glass, having a relatively low fusion temperature. See column 3, lines 25 to 35 thereof. Becker provides that the glass particles serve to bind the ceramic particles. The binder glass portion binds the ceramic particles together and binds the coating to the substrate cookware. In other words, the ceramic particles are never melted. The coating may be applied as a single coating, as a mixture of glass frit and ceramic particles, or a base coat of frit may be applied and then a mixture of frit and ceramic particles may be applied as a top coat to this base coat application, see Examples 1 and 2 of Becker. Becker teaches that the porous structure in this mixture be in the range of from 15% to about 55% by volume and, preferably, from about 22% to about 42% porosity by volume. See column 4, lines 1-9. Clearly, Becker departs from the instant invention in that the coating of Becker employs a glassy frit component which binds the ceramic particles to each other and to the substrate, whereas in the present invention only a metal-ceramic layer is applied to a controlled lower porosity of about between 5-15% by volume. Hence, the material structure of the porous layer is different and the porosity is lower in the present invention than in Becker. In addition, the metal-ceramic layer of the present invention is applied by high temperature spraying, whereas the layers of material applied in Becker are done at room temperature and then later thermally treated to achieve fusion of the vitreous glass layer for binding purposes. See, for example, Examples 1 and 2 where the base coat was applied at room temperature and later fired at 1,000°F for six minutes. Subsequently, the top coat was applied by spraying at room temperature over the final base coat and then fired at 1,000°F for six minutes. This is contrasted with the present invention which does not employ a glass frit binder component but, rather, employs metal-ceramic material which is applied by high temperature spraying to achieve fusion in the spray and then direct adhesion to the surface of the substrate. Because the porosity is much lower in the present invention than in Becker, the liquid release agent in the present

invention must be impregnated in a vacuum to assure that the pores are filled with the liquid release agent.

Finally, and most importantly, Becker does not conceive at all or fairly teach the concept of applicant's non-stick surface achieved in step (f) where the impregnated metal-ceramic layer is subjected to a smoothing step to remove the upstanding sharp peaks of metal-ceramic to provide a non-stick surface defined by flat bare metal-ceramic portions and flat impregnated cured release agent areas substantially co-planar therewith. To the contrary, Becker teaches at column 2 a non-stick surface which is defined by the impregnated cured release agent alone. In this regard, Becker teaches at column 2, lines 45-58:

"FIGS. 2 and 3 illustrate a substrate and composite layer of the present invention. In this case, a substrate 14 carries a composite layer, generally represented at 15, which comprises a porous ceramic body 16 so formed as to have a continuous, communicating pore structure represented at 17. A film-forming, polymerized, organic, resinous impregnant 18 fills at least some and preferably all of the pores. It is also preferred that an excess of impregnant 18 extends over the exposed surface of layer 15 completely to cover the ceramic body and form a continuous, relatively thin skin 19 of the impregnant. The skin improves upon the release properties of layer 15 without sacrificing any abrasion resistance."
[Emphasis supplied]

Hence, Becker teaches that the ceramic particles do not reach the outer surface of the release agent but, rather, reside below the surface thereof. In addition, the finished surface of Becker is not smooth, nor is it subjected to a smoothing step in accordance with step (f) of claim 11. The non-flat surface shown in FIGS. 2 and 3 of Becker make this fact abundantly clear. On the other hand, Applicant's claimed method provides a non-stick surface defined by flat, bare metal-ceramic portions and flat impregnated, cured release agent areas substantially co-planar therewith.

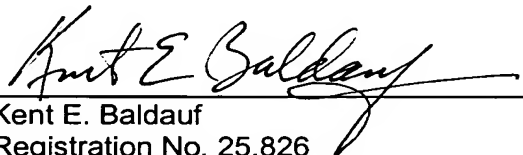
The citation of Groll does not add anything to Becker but, rather, would seemingly not be combinable with Becker in the manner proposed by the Examiner. Groll, in fact, teaches the smoothing of the substrate metal surface prior to application of a non-stick surface, not the smoothing of the finished applied non-stick surface as proposed by the Examiner. See, for example, column 2, lines 6-13, which provides as follows:

"Briefly stated, the cook surface of the invention comprises a hard substrate metal such as stainless steel, carbon steel, titanium or the like, which is buffed to a high luster finish of less than 20 micro inches, preferably in the range of 9-12 micro inches, and still more preferably about 2-6 micro inches. The buffed surface of the substrate metal is cleaned and then coated with the preferred material, zirconium nitride." [Emphasis supplied]

Hence, if the teachings of Groll were followed, the substrate (aluminum pan) of Becker would be buffed to a high luster finish prior to application of the mixture of glass frit and ceramic materials. There is absolutely no teaching in Groll that the finished non-stick surface be smoothed after application of the non-stick layer.

For the reasons outlined above, it is submitted that the present invention represents a patentable advance over the cited prior art. The Examiner's reconsideration and favorable action are respectfully requested.

Respectfully submitted,
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